

## 5 CLAIMS

1. An interleaver for a turbo encoder and decoder comprising a first table populated with a first set of parameters to allow intra-row permutation of data within an array in accordance with a first wireless communication standard when operation in the first wireless communication standard is required and a second table populated with a second set of parameters to allow inter-row permutation of the data in accordance with the first wireless communication standard when operation in the first wireless communication standard is required wherein the first table is populated with a third set of parameters to allow intra-row permutation of data within an array in accordance with a second wireless communication standard when operation in the second wireless communication standard is required and to populate the second table with a fourth set of parameters to allow inter-row permutation of the data in accordance with the second wireless communication standard when operation in the second wireless communication standard is required.
2. An interleaver according to claim 1, wherein the first wireless communication standard is the family of WCDMA standards within 3GPP.
3. An interleaver according to claim 1 or 2, wherein the second wireless communication standard is the family of WCDMA standards within 3GPP2.
4. An interleaver according to claim 3, wherein the parameters populated in the first table are  $(R_j) \bmod(p')$ , where  $j$  is the row number for the data array,  $R_j$  is a row specific prime number for the array and  $p'$  corresponds to a

- 5 selected prime number minus 1 for the 3GPP standard and the total number of columns within the data array for 3GPP2.
5. An interleaver according to any preceding claim, wherein the parameters populated in the second table are inter-row permutation sequences multiplied by column numbers associated with the data array.
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6. An interleaver according to claim 4, further comprising a multiply and modulo module arranged to receive  $(R_j) \bmod (p')$  values from the first table and to generate and output via a first output  $[ixR_j] \bmod (p')$  where  $i$  corresponds to the columns of the data array.
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7. An interleaver according to claim 6, wherein the multiply and modulo module is arranged to generate and output via a second output  $[ixR_j] \bmod (p')$  when operating in the the family of WCDMA standards within 3GPP2.
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8. An interleaver according to any preceding claim, further comprising a buffer arranged to compare received interleaved addresses with the size of the data array and to store valid addresses.
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9. An interleaver according to claim 8, wherein the buffer is arranged to control the flow of data into the interleaver, such that when a predetermined number of addresses have been stored in the buffer the buffer stops the flow of data into the interleaver to allow the outputting of addresses from the buffer to be performed at substantially a constant rate.
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- 5 10. A turbo decoder comprising an interleaver according to any preceding claim  
and a processor arranged to populate the first table and second table with  
the first set of parameters and the second set of parameters respectively  
when operation in the first wireless communication standard is required and  
to populate the first table and the second table with the third set of  
10 parameters and the fourth set of parameters respectively when operation in  
the second communication standard is required.
11. A turbo encoder comprising an interleaver according to claims 1 to 9 and a  
processor arranged to populate the first table and second table with the first  
15 set of parameters and the second set of parameters respectively when  
operation in the first wireless communication standard is required and to  
populate the first table and the second table with the third set of parameters  
and the fourth set of parameters respectively when operation in the second  
communication standard is required.
- 20 12. A method for interleaving in a turbo encoder and decoder comprising  
populating a first table with a first set of parameters to allow intra-row  
permutation of data within an array in accordance with a first wireless  
communication standard when operation in the first wireless communication  
25 standard is required and populating a second table with a second set of  
parameters to allow inter-row permutation of the data in accordance with  
the first wireless communication standard when operation in the first  
wireless communication standard is required and populating the first table  
with a third set of parameters to allow intra-row permutation of data within  
30 an array in accordance with a second wireless communication standard  
when operation in the second wireless communication standard is required  
and populating the second table with a fourth set of parameters to allow  
inter-row permutation of the data in accordance with the second wireless  
communication standard when operation in the second wireless  
35 communication standard is required.